PATTERNS FOR ELECTRIC TABLE LAMP FREE INSIDE

Hobbies WEEKLY

CONTENTS

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Complete with steering arrangement — a

TOY BREAKDOWN LORRY

THE breakdown lorry shown in our sketch on this page should appeal to all our toy makers. It is a model simplified to suit quick work and simple assembly. Upon a plain and easily-made floor and chassis is the turntable crane with winding drum and crank complete.

Under the bonnet is a novel form of steering arrangement, by means of which the front wheels are made to turn from side to side just like a real motor car or lorry does. There is a projection in front of the bonnet which controls the steering by simply turning it in whatever direction required, the wheels being pivoted on a straight axle beneath. A draw-bar can, if desired, be pivoted into the above projection, making the toy more suitable, perhaps, for use on the floor than on the table.

At Fig. 1 we see a plan diagram of the floor. This is cut, as are most of the other parts, from ¼in. wood. The floor is marked as A, and underneath its side projections are glued the two bearers, B. Note where the hole comes in the floor and in the two pieces, B, the latter to take the screws which fix the rear wheels.

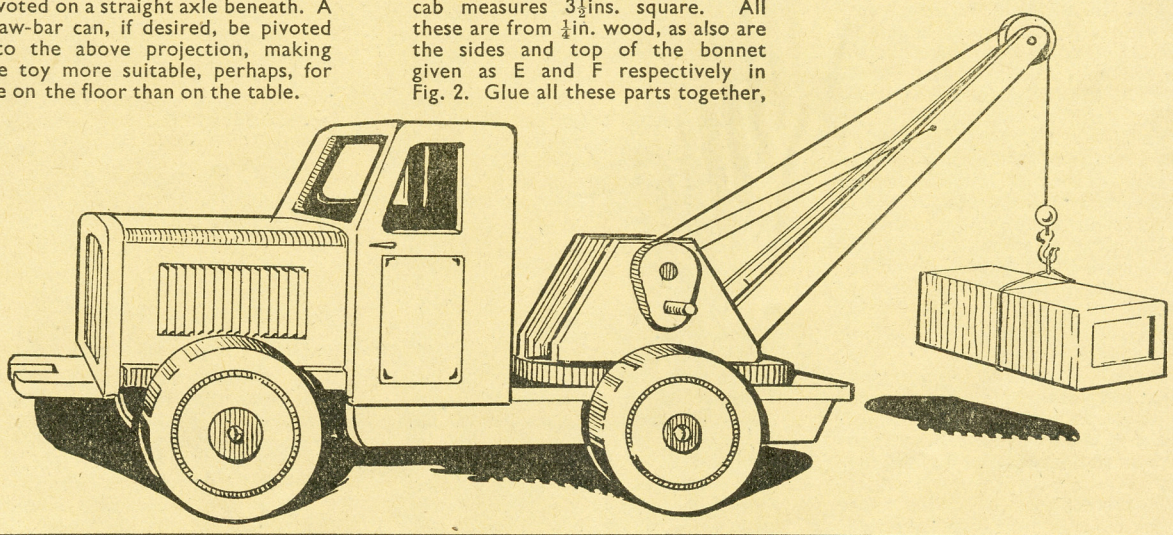
Connecting the pieces, B, is piece, D. This is to take the lower end of the spindle or pillar, round which the crank revolves (see Figs. 2 and 3).

Cab Parts

The measurements and shape for cutting the sides of the cab are given in Fig. 1, while the back of the cab measures 3½ins. square. All these are from ¼in. wood, as also are the sides and top of the bonnet given as E and F respectively in Fig. 2. Glue all these parts together, and then cut a piece of ¼in. stuff 3ins. by 2¼ins. for the radiator front, and glue this on. All sharp angles and edges should be glass-papered off.

Piece, G, seen in Fig. 2 goes between the two sides of the cab. It measures 3½ins. by 2ins., its top edge being rounded off. The roof of the cab measures 4ins. by 2ins., and is of ¼in. stuff. It is rounded off on all edges.

We next turn our attention to the crane which can be made independently and placed over the pillar seen in Fig. 3. This pillar is ¼in. diameter and is rigidly fixed into the piece, D, after passing through the



hole in floor, A, where it is again touched with glue. The pillar must stand at a rightangle with the floor to allow the turntable to revolve freely and evenly round it.

The construction of the turntable and parts of the crane fixed to it are given in Fig. 4. Cut these parts from ¼in. stuff. The turntable, I, itself is circular with 2ins. radius.

Note in Fig. 4 the shape of the sides, H, and the cross bar, J, which connect them and through which passes the crane pillar. Glue all the parts together and add one or two

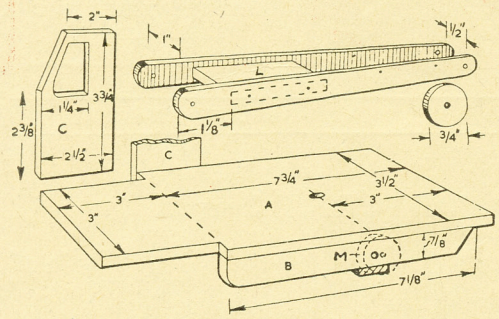


Fig. 1—General layout of chassis and jib arm

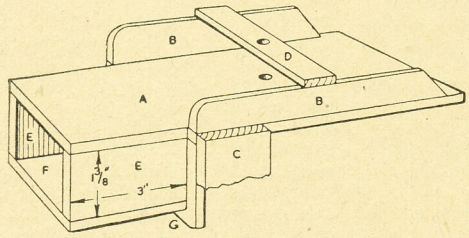


Fig. 2—Underview, with bonnet added

fret pins in places to make a very secure fixing.

Now get a small cotton reel and a piece of round rod. The latter should be 2½ins. long, which allows of a ¼in. projection beyond each side, H. One ¼in. projection is taken up by the crank, K, in Fig. 4, which is securely glued to the rod. Glue to the rod after this has been passed through the sides and the reel itself.

Should a small reel be unobtainable, then the rod itself will act as the winding drum. A round washer must, however, be added on the outer end of the rod to prevent it pulling through when turning. A small piece of round rod should be glued into the crank to form a handle.

The crane arm is made as shown in the upper diagram in Fig. 1. Two pieces of 3/16in. or ¼in. wood 7½ins. long are cut to taper from ⅝in. to ⅜in. and rounded at both ends. A spacing piece of ¼in. stuff is cut to fit between the two arms as, L, in the diagram.

The correct shape of the piece can be got by laying the two long side pieces in place on the table and spacing them to 1in. and ½in. as shown. Then at a distance of 1⅛ins. from the large end, lay the piece, L, and mark off the slopes on it, thus getting accuracy of fit when cut and glued in. A couple of fret pins run through each side as shown will stiffen the fastening.

Make holes in the top and bottom ends of the arm. The former are to take a small grooved pulley ¾in. in diameter. The grooving can be carried out very easily with a rat-tail file, the disc of wood being held in a vice during the process of filing. The crane arm is pivoted to the pieces, H,

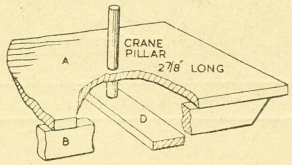


Fig. 3—Crane spindle fixing

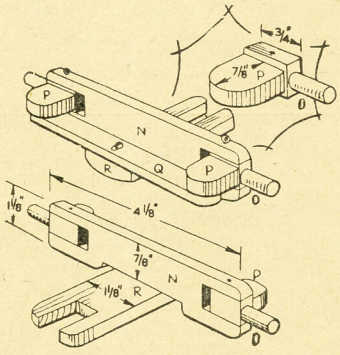


Fig. 5—Detail of steering mechanism

by means of a length of wire passing through the holes shown. Or the arm may be simply held by two screws run in from the outer sides.

Wire acts as supports or stays for the crane arm as shown in detail in Fig. 4. A small ball weight and a hook is tied to a length of cord which is passed over the pulley and down to the winding drum where it is tied securely ready for hoisting. To the outside faces of the pieces, B, on the chassis is next glued circular washers or discs, M, see Fig. 1. These are really spacing washers and hold the wheels away clear of the sides, B, and also give clearance for the crane turntable to move round.

Finally turn to the steering arrangement of the front pair of wheels. It must be understood, of course, that being a toy, the lorry is not intended to be controlled by a steering wheel in the cab. A dummy wheel and pillar can be added if desired, of course. The method of making the contrivance which actuates the wheels is clearly shown in the two diagrams in Fig. 5.

There is a main axle bar, N, cut to the shape shown with the fretsaw from ⅜in. wood. From each end of this bar, the blocks, O, are cut round and the projecting spindles shaped up from these solid pieces to take the wheels which will have to be cut carefully to the diameter of the spindles. The two end blocks must be pivoted in the slots, as it were, so they turn in both directions, giving ultimately the swing of the wheels when these are put on.

Pivot Action

In both diagrams in Fig. 5 the blocks are shown pivoted, the upper diagram showing wire looped and driven down through the projecting lugs and through the blocks. In the lower diagram, Fig. 5, the holes only are shown.

To the blocks, O, are next glued the lugs, P, shown in the enlarged outline of one of these in the upper diagram. Drill holes in the lugs, P, and pivot the connecting bar, Q, to them, so the movement combines both lugs, P, with their axle blocks. Make a small slot in the middle of Q, through which a screw may pass to the member, R, which is clearly shown in both diagrams in Fig. 5.

Next pivot, R, to the main axle by running a round-head screw into the cross axle bar, N. The piece, R, should move freely about its pivot screw to allow free movement.

When the wheels are in place and the main axle bar screwed or glued to the underside of the chassis, a turn of the projecting member, R, will bring the wheels to the angle required.

The front wheels will fit over the projecting spindles and be held in place by a thin wood washer being screwed on from the face. The rear wheels are simply attached by round-head screws, these being long enough to pass through the wheels and into the washer, M, and the sides, B. The four actual wheels can be obtained direct from Hobbies, Ltd. They are 2½ins. in diameter and ⅝in. thick. Appropriate screws, therefore, should be 1¼ins. for the rear wheels, with quite short ones for the front wheels.

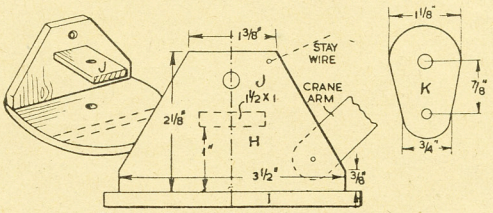


Fig. 4—Parts of winding apparatus

It should have been noted previously that the back edges or corners of blocks, O, must be rounded to allow the spindle end to turn. Those shown black in Fig. 5 indicate the parts just referred to.

The woodwork of the toy should be thoroughly cleaned with fine glass-paper before the painting is done. Bright colours should be used.

Almost any home constructor can confidently build this TWO-VALVE RECEIVER

THE constructor can quite easily build a two-valve receiver for the usual long and medium waves, and not many parts are required. If any components happen to be to hand, then these can be used, because the circuit is not critical. As a guide, the list of requirements which can be used is shown in the accompanying panel of components.

Reception Details

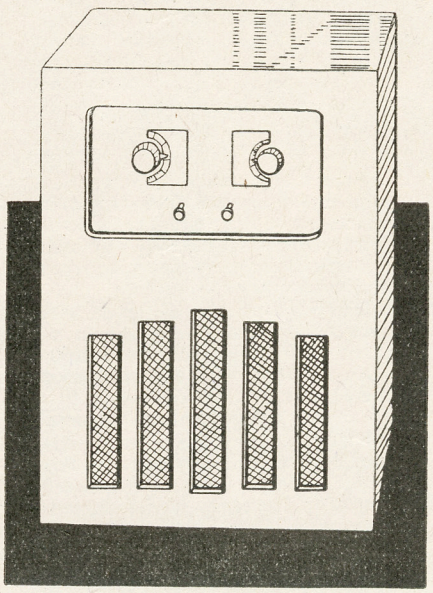
Volume and range will depend upon the valves used, the high tension battery voltage, and the aerial and earth. For quite good volume from the nearer stations, an indoor aerial is suitable, but an outdoor one will naturally provide stronger signals. Again, though good results can be obtained with no earth, it is worth while using a good earth when possible.

If a pentode valve is used in the right-hand holder (see notes later), with a 120 volt H.T. battery and an average moving coil speaker, aerial and earth, then volume will be ample for all domestic purposes on the more powerful stations, and a number of distant stations will be receivable at good volume.

For bedside or personal listening far less volume is required and a few yards of wire can be used as aerial, with no earth if inconvenient. Under such circumstances it will be possible to use a 60 volt H.T. battery.

Baseboard and Panel

Both baseboard and panel are 6ins. by 11ins. Plywood can be used for the panel, which is screwed upright to the front edge of the ½in. thick baseboard. Holes for the controls can be drilled from the dimensions given in Fig. 3. The valveholders and other parts can then be screwed down in the positions shown in Fig. 1.



Two small terminal or socket strips are screwed to the rear of the baseboard. When the tuning coil is made, it is mounted on two small blocks of wood with small screws.

The panel should be glasspapered and varnished, and two small scales can be fixed as shown in Fig. 3. These can be purchased, or drawn on paper or card. The right-hand scale can be marked "Volume" and the left-hand scale "Tuning". Any type of on-off switch can be used.

Winding the Coil

The detail at Fig. 2 shows the number of turns to use on a 2in. diameter former, and the ends of the windings are lettered to agree with connections in Fig. 1.

A varnished cardboard tube is quite satisfactory, and the wire can be anchored by passing it through pairs of small holes made in the former. Leave about ¼in. between the two 60-turn windings. The upper- most of the four pile windings is about ⅛in. from the central winding, and about ⅛in. should be left between each pile.

If the ends of the various windings are left long enough they will reach right to the components in the set. For the tapping "B" make a loop about 2ins. long and pass it through two small holes. It is important that all windings be in the same direction, as illustrated, but the actual gauge of wire used is not very critical.

Wiring up

Fig. 1 should be followed carefully for wiring the set correctly. Lengths of flex are used for the battery connections. Old transformers may be marked "P" and "S" (Primary and Secondary) ; if so, then the primary tags should be connected to "P" on the valveholder and H.T.60 volts, and the secondary to grid bias and "G" on the second holder.

If uncontrollable hooting results, reverse the leads to the secondary of the transformer.

If a high frequency choke is to hand, this should be wired between "P" on the valveholder and "P" on the transformer. It is also possible to use a resistor of 5,000 to 10,000 ohms here, to improve reaction.

Chassis-type valveholders can be mounted on small blocks of wood so leads may be taken directly to the socket tags. Take care leads cannot touch if uninsulated wire is used.

Pentode Valve

If the extra amplification which a pentode valve provides is desired, then the right-hand valveholder should be a five-pin one. The extra terminal (which goes to centre pin of the valve when the latter is inserted) is wired to H.T. plus 120 volts.

A condenser of about .005 mfd. can be connected across the speaker terminals to mellow reproduction.

Constructing the Cabinet

The cabinet should be 11ins. wide

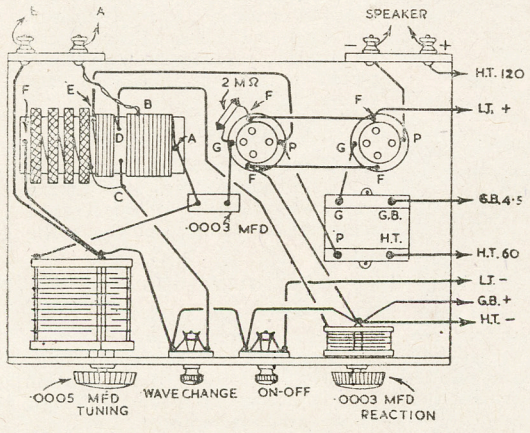


Fig. 1—Plan of base with complete wiring diagram

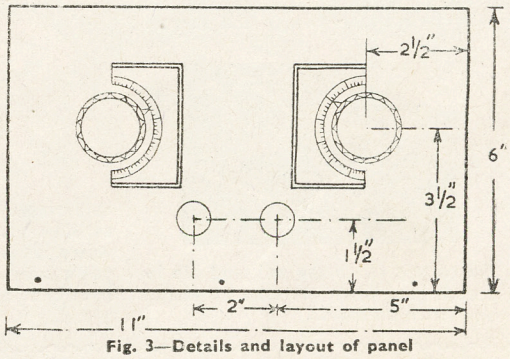


Fig. 3—Details and layout of panel

by 6½ins. deep by 15ins. high, inside measurements. If ½in. thick wood is used, the bottom will accordingly be 11ins. by 6½ins. and each side 15½ins. by 6½ins. The top will be 12ins. by 6½ins. and a plywood front 12ins. by 16ins. will fit over the whole.

The front has a top cut-out about

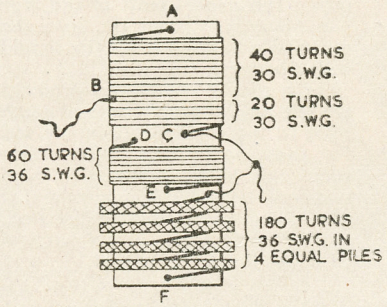


Fig. 2—Winding the tuning coil

5ins. by 9ins. When the receiver is pushed in from the back the base-board should rest on strips screwed along the sides of the cabinet so the panel comes up against the top rectangular cut-out. Four small screws inserted from the inside will then hold the receiver secure.

For the bottom speaker fret, numerous designs are possible. The illustration shows one quite simple and effective. The whole cabinet should be carefully finished off, and a suitable piece of fabric glued over the inside of the speaker fret.

The loudspeaker is screwed on from the back. It may be screwed to the cabinet front, or to a piece of wood (with a central hole the same size as the speaker cone) about 11ins. by 9ins. If the latter method is used, this baffle board, as it is called, is in its turn screwed up against the speaker fret from behind.

Using the Set

Insert the valves and connect aerial, earth and batteries. Stations should be located without difficulty, and the reaction condenser should be closed until the set is almost oscillating when maximum volume is required.

Different values of grid bias between 1.5 and 9 volts should be tried, depending upon the output valve and H.T. voltage used. Adopt the highest G.B. voltage which does not cause distortion or loss of volume.

If different valves are to hand, these should be tried in each holder to find which is best. Switch off between each trial. For best results, a detector type valve should be used in the left-hand holder, with a small power valve in the right-hand holder (viewing the receiver as in Fig. 1, *not* from the back).

If a very short indoor aerial is used, volume will be increased if this is taken directly to point "A" on the coil, instead of to the tapping. If an earth is available, but no aerial, it is often best to take this to the aerial terminal, instead of the normal earth terminal.

Sharper Tuning

If it is desired to increase sharpness of tuning, a small variable or pre-set condenser can be connected between aerial and aerial terminal, and adjusted until the desired selectivity is obtained.

The set is economical to run, and can give all the volume required for ordinary listening, if the instructions given are followed carefully.

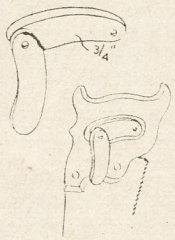
COMPONENTS NEEDED

One .0005 mfd tuning condenser with knob.
One reaction condenser with knob. (.0002 to .0005 mfd.)
Two on-off switches.
One .0003 fixed condenser.
One 2 megohm grid leak.
Two valve holders.
One L.F. transformer, ratio about 1:3 or 1:5.
Two small terminal or socket strips
Detector and Output valves.
One small loudspeaker.
Wire, plugs, and similar small items.

Hints and Tips worth remembering—

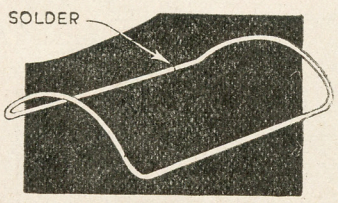
A Saw Holder

TO hold your saws in their place all you have to do is to get two pieces of wood about 2ins. by 4ins., one ⅜in. and the other ¾in. thick. Then cut them as shown in the sketch. Now take two flat-head screws and put them where shown in sketch. Screw them on the side of your bench so when the saw is in it looks as indicated in the lower picture.



Galleon Sails

A CHEAP and satisfactory way of forming galleon sails is to make a wire frame as shown in the sketch.



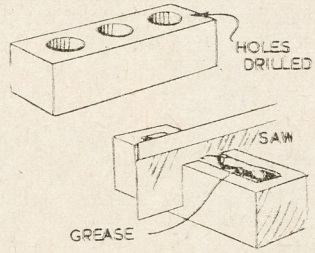
On to this stitch the sail, and dip in scotch glue when set take off frame and stitch on spars.

Cleaning Records

HERE is how to clean gramophone records and make old ones sound like new. Mix two parts of white vinegar to one part of light oil and stir well. Paint the records with it and leave for two or three minutes. Then wipe with a clean rag and leave to dry. It will be found they play very much better.

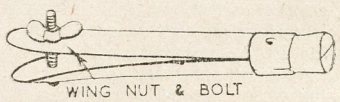
Bench Grease Box

A BOX of grease is always found useful on a bench. A box can easily be made by drilling two or three large holes in a block of wood as illustrated. Then chisel out the waste. Now fill this with grease and put a sawcut through the middle to run the saw through when the greasing of it is wanted.



Clothes Peg Vice

WONDERFUL what you can do with a common or garden clothes peg when you try. You can make one into an extremely useful little vice, for example. Cut out the inside of the peg with a fretsaw, as shown. Get a small bolt with a wing nut. Slip bolt through holes made at the ends of the peg, and by means of the wing-nut the ends of the peg can be brought together so any object placed in this vice is gripped very securely.



Weeding Kneeler

DO not throw your old rubber hot water bottle away. It will make an excellent kneeler for weeding and shearing on damp ground in the garden.

Film Windows

DO not throw away clear blank negatives from films which have failed to come out. They form a very effective and realistic substitute for glass windows in model buildings, railway stations, motor cars, etc.

A Craftsman's Notebook

Inn Sign Hobby

HAVE you ever thought of Inn Signs as a sideline to your usual hobbies ? What about jotting down all the new ones you come across, with the name of the town or village where you saw it ?

It is an interesting pastime, for it is quite surprising how many different inn names there are, and some of them are quite unusual.

One enthusiast aims to get together a really comprehensive collection, including all the more common as well as odd names. His idea is to take a snap of the actual sign bearing the name of the inn, and occasionally he comes across what he calls a special find—that is, a board that is unique in itself, besides having a curious name.

In due course he intends to start classifying. One series might contain all those with a reference to horses, such as Bay Horse, Wagon and Horses, Horse and Jockey, and Flying Horse. Another group would be devoted to those with a town in the name, like Manchester Inn and Scarborough Arms, and so on.

Why Movies Move

WITH the film running through the projector at such a speed one would think that pictures projected on to a cinema screen would look blurred. The mechanism is so designed, however, that each picture halts in front of the lens for a fraction of a second, and when it moves along the light is automatically cut off by a shutter. On the screen we therefore really see a succession of still pictures.

Why then, one might ask, do not the pictures appear to jerk along, with a quick flash of blank screen between each ? The reason for the impression of continuity is an optical illusion known as 'persistence of vision', which causes an image to linger in the eye for a brief period. Thus, in movies the next picture takes its place before the previous one has had time to entirely disappear.

It is rather like a quick blink of the eyelids, the scene being momentarily shut off, though we do not notice the fact because the image persists during the very brief period the eyelids are closed.

Cine Sizes

INTERESTED in the idea of showing pictures at home an amateur was asking me what sizes of film there are apart from the standard 35 mm. used in cinemas.

The three sub-standard gauges of silent cinematograph film are 16 mm., 9.5 mm., and 9 mm., all having a non-inflammable base which obviates risk of fire. These measurements are made from edge to edge of the film and do not indicate the actual width of the picture.

In 16 mm. the sprocket holes by which the film is propelled through camera and projector are placed down each side as in standard film, so that excluding these edges the actual width of the frame (i.e. picture surface) is 10.5 mm. and the height 7.5 mm.

The 9.5 mm., however, is perforated differently. Here there is only one set of sprocket holes situated down the centre between the frames, leaving a picture area 8.5 mm. wide by 6.5 mm. high.

My measurements show that in the 16 mm. gauge there are 40 pictures to the foot of film, and in 9.5 mm. there are 40½ to the foot, but for practical purposes we may reasonably reckon them both as forty to the foot. Running at the usual silent rate of sixteen frames per second a given length of either film would occupy the screen for approximately the same length of time, a 100-ft. film, for example, running for a little over four minutes.

The 8 mm. gauge also has a single set of perforations, but they are situated at the side, the picture area, which is a quarter that of the 16 mm., measuring 5 mm. by 3.75 mm. It follows that there are twice as many pictures to the foot, so that 50 feet of 8 mm. is equivalent in showing time to 100 feet of 16 mm. or 9.5 mm.

Silent movies being more economical for most amateurs, these details refer to such film, but it is interesting to note than sub-standard talkies are also made.

The Craftsman

A Reader's Plan for Doll's House Lighting

I NOTICE several queries re Doll's House Lighting, and give particulars of what I have done in this matter, which may be of interest.

A very satisfactory method of lighting a Bungalow is to fix an ordinary B.C. Holder under the roof by screwing it to a block beneath the chimney so that a 15 or 20 watt lamp can be used horizontally for the lighting. The flex from the lamp holder is attached to a flat type of plug connector screwed to the chimney on the outside.

Connecting Plug

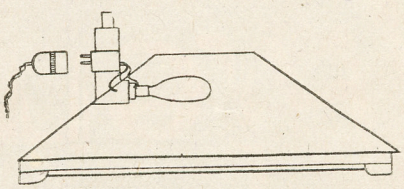
The socket side of the plug is fixed to the flex which carries the current from the lighting supply. In this way there is no danger of shock from the two projecting terminals should the plug be pulled out accidentally.

To light the various places, pieces are cut out of the ceilings of the four rooms and passage 2½ins. by 1¼ins., and for the smaller bathroom 1½ins. square, the openings being covered with tissue paper or other means of slightly obscuring. These openings are covered with hinged flaps about ⅜in. larger than the openings so that the light is shut off when the flaps are closed.

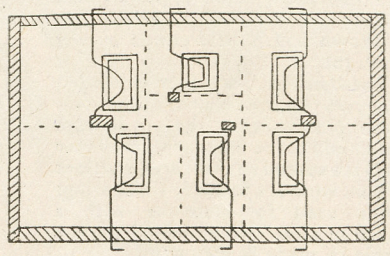
To Open the Flaps

The flaps are operated by wires which come through the ⅜in. bead fixed round the edge of the ceiling (which is attached to the roof by clips). This gives operating room and increases the height so the wires can be fitted to small blocks near to the flaps.

There are three bent wires at the front and three at the back for the four rooms, passage and bathroom. Each room can be lighted by lifting the flap, the effect being one of indirect lighting. It is advisable to have the holes for the lighting more in the centre of the ceiling to leave room for the flaps to work under the roof. (Albert D. Evans, Gateshead).



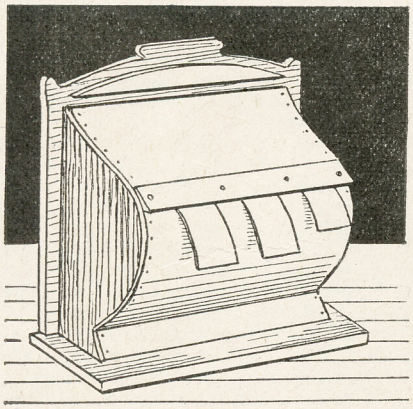
A skeleton view of roof with plug on chimney, and inside lamp bulb



Plan of roof showing catch wires for flaps and outside turning handles

A handy little accessory to act as an

ADHESIVE PAPER HOLDER



GUMMED strip-paper, which can be bought at any stationers is being increasingly used for sealing small parcels, reinforcing envelopes, etc. Here, therefore, is a design for a holder which will be useful to anyone using a desk, or as a general household accessory.

The holder consists of three small divisions in which rolls of adhesive paper stand vertically. They are put in through a door at the back and the ends of the paper strips are fed through slots in the front from where lengths are pulled as desired.

The first thing in making is to shape four pieces as (A). These are 3¾ ins. high with a 2¾ ins. base, the circle (part of which forms the outer edge) being 1¼ ins. diameter.

Base and back are now cut, the former being 3½ ins. by 5 ins. and the latter 4½ ins. wide and 5 ins. to the highest point. The top of the back however is shaped as (B) which brings the height at the sides down to 4½ ins. The back is inset into the base by cutting a strip 4½ ins. by ¼ in. from the rear edge of the latter.

Back Door

From the back a rectangle is cut, the portion taken away being used for the door (a). The rectangle is cut with its sides ½ in. from the ends and base, and is 2½ ins. high. To form a door it is attached by two hinges as shown and is held closed by the catch (b).

The base, back and four pieces (A) can now be assembled. The two outer pieces are secured ¼ in. in from either end of the back, while the inner ones are spaced so that three divisions of 1 in. wide are formed; ½ in. springs being used for fastening with a touch of glue. When joined up, the frame so made is very sturdy.

Now comes the covering sheet (b) and the strip (c). The latter is a strip of plywood but the former a rectangle of thick but pliable card—the exact length being found by experiment. From the bottom the sheet is gradually curved round till a line where it joins the back is reached, using sprigs about every ½ in.

For Easy Running

At the top a clean edge is made by running a sharp pointed knife along several times, then with a chisel pushed in from the side removing a small triangular strip so that the upper edge of (b) will become 'inset', and flush with the back.

The strip (c) is ¾ in. by 4 ins., the longer edges of the pieces being bevelled to meet the base and (b). It is secured with sprigs as with the large sheet.

The slots (h) are now made, again using the sharp point of a blade, with something pushed in from the back to support the wood if necessary. The slots are 1 in. long and 1/16 in. wide.

Strips and Sides

Finally, fit the triangular strip (e) and the ornamental piece (p). The triangular strip is secured by small screws or sprigs through the pieces (A), four screws or sprigs in all being used; one to each. The triangular strip (e) should be made with some care and its exact shape is best found by a little experimenting. It must lie well against the curve of the body and its underside must be horizontal. Its outer edge is brought to a fine line as this helps in cutting off the desired lengths of gummed paper.

The overlay (p) is just to give a little ornamentation and finish. It is from ⅛ in. material and its upper side is shaped round to agree with the curve of the top of the back, the lower edge being straight. A touch of glue holds it quite well in position.

Colouring

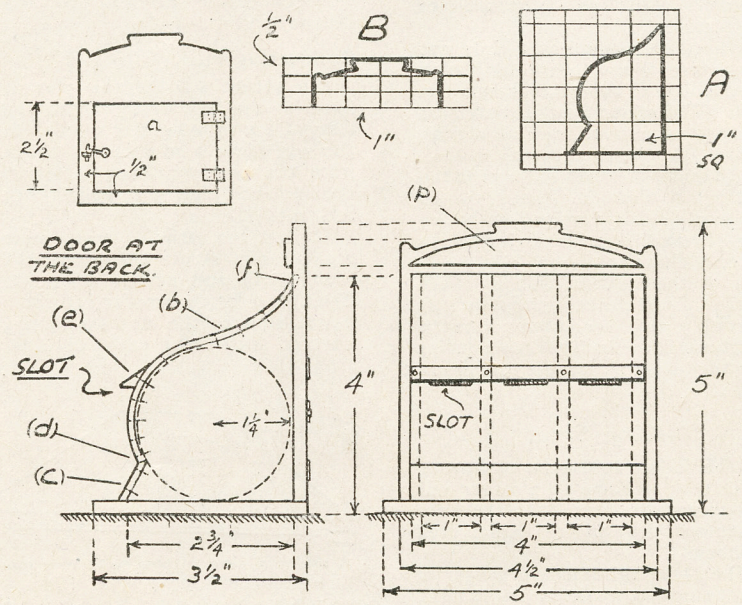
Everything is now completed except colouring or staining. If a good brown or other finished card has been used for the curved section this can be left as it is and the rest of the woodwork stained and polished.

If the card is not of good appearance it, too, must be covered with the stain which most cards will take quite well, although their surfaces cannot be satisfactorily polished. Also if nicely headed sprigs have been employed their tops can be wiped clean and in themselves give the impression of further ornamentation.

To use—the rolls of adhesive paper are placed in the divisions through the door at the back and the ends are fed through the slots, a little being left hanging out. After as much paper as is necessary for the job has been pulled through it can either be creased and torn or it can be broken off with a smart upward motion against the edge of the triangular strip.

A Larger Size

As given here the holder is for three strips of 1 in. paper but there is considerable scope in the making of these things. A four-roll or more, holder could be constructed or the size of the divisions could be varied to allow of the insertion of papers of different widths.



Little things make for good construction when you are

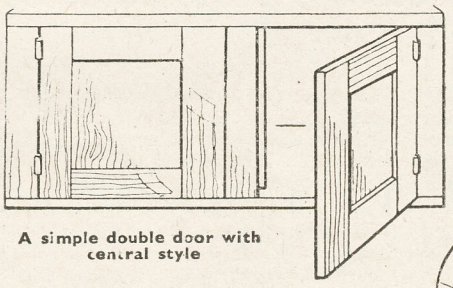
FITTING SMALL DOORS

THERE are so many occasions when the ordinary woodworker has to fit small doors, that a few notes on the subject will be worth bearing in mind. We are dealing more particularly with the small type in cabinets, boxes, etc., such as those found in the designs published in these pages. In all of them the same principle is involved, and there are also many other jobs of a similar nature which the woodworker undertakes.

Hinge Fitting

By doing them correctly, he can save himself quite a lot of trouble and at the same time make a really workmanlike job of it. Nothing looks worse than to see a badly hung or an ill-fitting door, and once it has gone astray in the fitting, it is an irritating matter to attempt to correct it.

A hinge may have thrown it out of place, and immediately you start to plane up one end to get the door to fit, the result is probably that instead of a good fit you have a gap at the wrong point, so that the door has a decided slope which throws it out of true and makes it look unsightly.



A simple double door with central style

Let us take the ordinary door and note the general principles of hanging and fitting. Usually it must be hung on a door stile and the hinges are fitted so the wood of both parts come close together and are not forced out with a gap between by the thickness of the hinge itself.

Recesses

For this reason, each half of the hinge must be recessed into the wood, whilst the knuckle portion projects just sufficiently to allow the door to swing but yet not be unsightly.

Mark off the position of the hinge by laying it in place and pencilling the amount of room it takes up. Then cut out the recess with a chisel, making sure to keep the bottom flat and the edges sharp so the hinge plate beds down into it.

The question of screwing must also be considered. If you are going into a thick door or the edge of the wood, a long screw can be used, but if you are putting it on the face of, say, $\frac{3}{8}$in. or $\frac{1}{2}$in. material, then the screw must not be so long that it projects through the wood. On the other hand, if the point of the screw does happen to come through a little way, it must be filed off flat with the wood itself.

Suitable Screws

Get a screw which passes through the holes of the hinges comfortably, yet allows the head to be flat with the plate portion and bed down snugly into the countersunk hole.

Be sure to get the hinges on to the wood square. Fit one plate of the two hinges on one portion first, then hold the door in place, open up the hinges and mark with a pencil the position of the hole in the other plate.

Be sure, too, to make a hole to take the screw to start with, and get this in the centre. Drive one screw home temporarily, then test the door out to see it fits properly. If it does not, take the screw out and put one in another of the holes as a temporary fitting, and test out again.

If these are satisfactory, then the remaining screws should be driven home. If the hinge accommodates six screws—three on each plate—two only should be put in at first until a satisfactory fit has been obtained.

Fasteners

At the other edge of the door we have to arrange for something to hold it shut, and several suitable catches are illustrated here which can be quite easily used. These catches have a shank which is put through a hole in the door itself, and this hole should be about two thirds of the way up.

It must be so placed that when the handle or knob is turned, the little brass catch behind engages with the door stile or with a suitable recess cut in the wood.

This is a matter of experiment, and is according to the type of door being fitted. If a plain knob is being added, then you must arrange for a suitable stop. Do not, in any case, allow the door to be pushed inwards to strain the hinges. A simple blocking piece can be added to the floor to provide a stop, and another one to the underside of the top.

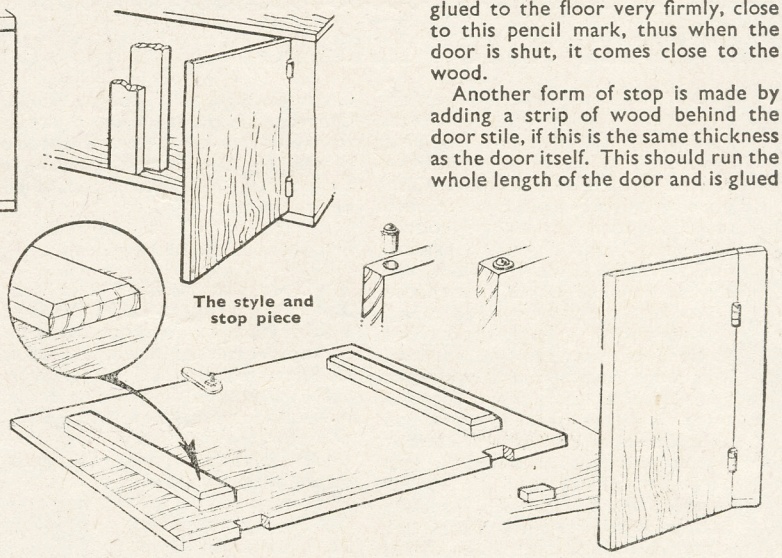
Marking Position

The position of this can be easily obtained in this way. Close the door and make a pencil mark on the floor. If the door comes flush with the front edge, then it is so much easier. Measure the thickness of the door and make a light pencil mark on the floor the same distance as this thickness. A thin block of wood is then cut, and glued to the floor very firmly, close to this pencil mark, thus when the door is shut, it comes close to the wood.

Another form of stop is made by adding a strip of wood behind the door stile, if this is the same thickness as the door itself. This should run the whole length of the door and is glued so that about $\frac{1}{8}$in. or 3/16in. projects over the opening.

In this way, when the door is closed the whole of its length butts up against the stop. This is undoubtedly better than a single floor stop because it holds the whole door. Whereas in the case of just the stop on the floor, the door can be pressed inwards at the top and so is apt to wring.

In some cases a pair of doors are required to close together as shown in the detail. In a case such as this, it is better to have a door stile between them, as shown, rather than to get the two doors to fit close up to each other. In this way you not only strengthen the framework around



Stiffening a door inside with cross battens

Small block floor stop

the door, but you can arrange for small bolts to be fitted inside one, whilst the other has the catch and knob.

These door stiles should be firmly held between the top and bottom, and if they are not actually part of the constructional detail, then the wooden block should be put behind them, and if possible, screws driven upwards into the ends to make a solid joint.

Door Stop

In a case like this, too, where the central stile is quite narrow, a door stop strip can be added to operate on both at once. This is done merely by having the strip about ½in. wider than the central stile so that a portion of it can project on either side. Tiny door bolts are now obtainable and easily affixed inside. Here again a little trial will soon show their position, and they can be screwed on the inside of the door with a hole made in the floor or the top to accommodate the sliding bar.

Another popular form of stop is the ball and catch which is also illustrated. With this the door is held in place when closed, but merely by pulling on the knob it will open comparatively easily.

Ball Catch

This is done by the ball and catch operating on the door itself, and on the framework. The catch portion is a short brass tube in which a ball is fitted with a spring behind. The ball projects slightly beyond the top of the tube, but is easily pressed in and out when the door shuts.

To fix it in place a hole is bored in the edge of the door of the same diameter as the tube itself. This must be a tight fit and the piece pressed home so the ball portion projects above the edge of the door itself. Then in the receiving side—the framework of the cabinet—is fitted a slightly recessed hole (it can be done with a countersink), around which is fitted a simple brass plate with a hole just large enough to accommodate the ball.

Thus, when the door is pressed shut, the ball is pushed into the tube, but springs out again into the accommodating hole in the cabinet.

So far as the doors themselves are concerned, if they are only of ordinary fretwood there is always the likelihood of twisting or warping. To overcome this it is often a good plan to put on two struts of wood across the grain as shown in the drawing herewith. These can be fairly thick, but should not be too unsightly.

Their thickness, too, can be less obvious by planing a chamfer along each side as shown by the detail. These struts, of course, should be firmly glued on equidistant from the edges, and there should be no need for screws if this is done thoroughly.

Framed Doors

Another plan to stiffen up the doors is to put a framework as can be seen in the drawing of the double door cabinet. The actual width of these panelling strips depends on the size of the door. They should not be too wide nor too narrow. The side upright strips should reach the whole length of the door, and the two horizontal pieces come between them.

Glue them on so the edges are flush with the edge of the door, and weight the whole thing down very firmly, after gluing, to prevent any wring. Securely glued there should be no need for adding screws.

From the Editor's Notebook—

LAST year, the Welfare Section of the Army Cadet Force Association introduced a national handcraft competition as part of the scheme of citizenship training. Cash prizes were offered in five different sections, some covering models, toymaking, plastic work, general utility articles, etc. When the competition had closed I, with the Editor of the Boy's Own Paper, had the honour of judging appropriate sections to select the final winners. We were very pleased with the general high standard of work, and in many cases, the ingenuity which had been displayed. In several cases it was most difficult to select the first three for placing, and the points awarded for cutting, finish, ingenuity and general excellence were very close. The picture was taken during the judging of the finalist entries in London, at the end of last year, and we were happy to be able to assist in such an excellent scheme. I hope every reader elligible will take part in any new competition announced for the current year.

TWO overseas readers, in different parts, are urgently asking for designs published long ago which are now out of stock, but which some reader may be able to supply. David Le Clue, Jubilee Street, Simonstown, Cape, South Africa, is asking for the St. Paul's Cathedral Design (No. 187 Special), or the Lord Mayor's Coach (No. 1985/6). Maurice N. Goodston of Dawn Grove Cottage, R.R.I. Severn Bridge, Ontario, Canada, is willing to pay up to five dollars for pattern and wood of the Big Ben Model, which was Design No. 209 Special, published before the war.

Any reader able to oblige should first write to the address given.

DO Hobbies Machines ever wear out, I wonder? D. H. Dixon of Blacket Place, Edinburgh, tells me his parents presented him with a Hobbies Companion Lathe in 1904 (45 years ago!) which is still in working order. A small motor has been fitted to it, and now the machine is being used by Mr. Dixon's nephew. Still going strong after 50 years.

YOU may remember I mentioned some time ago a reader who had one of the Big Ben Clock designs published some years before the war and offered it to any worker. Well, within eleven days ten requests had been sent to the address given, and the reader was in a quandary who to select. He finally decided on an enthusiast living in a rural district of Lincolnshire who had won recognition for his models of the Coronation Coach, the Lord Mayor's Coach, and the Queen Mary. He certainly was a model maker who deserved encouragement.

I HAVE told you before about people who make a hobby of matchbox label collecting. Master Paul Bond of Cowper Rd., Moordown, Bournemouth started when he was six, and now at 12 years old he owns 1,250 labels representing 34 countries. Missionaries overseas are apparently a fruitful source of supply. Incidentally the hobby—officially known by the awkward name of Phillumeny—is increasing in popularity.

The Editor

Photo by London News Agency Photos

From tins and tubes you can make this automatic

TABLE FOUNTAIN

THERE is always a fascination in watching a fountain playing in the centre of a stately lawn, and we often envy the owner of such an ornament. We need not despair, however, for it is quite easy to make a very effective self-acting fountain which can be made small enough for a table decoration. The materials needed are all easily obtained and the making should not present any great difficulty to anyone who is handy with a soldering iron.

How it Works

Before telling you how to make the fountain it would be as well to explain exactly how it works. The apparatus consists of two tins placed one above the other with a space between them. The tin marked A in the illustration has a bowl attached to the top of it, which takes the place of a lid, and connecting the two is a jet, D, which is removable.

To start the fountain the top tin, A, must be nearly filled with water, which you can do by removing the jet and pouring some in. Do not put in too much or it will overflow through the pipe E into the bottom tin and stop the fountain from working properly. Now put back the jet securely and pour some water into the bowl C. About half full will do, leaving the top of the jet uncovered.

Compression Effect

The water in the bowl will rush down pipe E into the bottom tin. The air in this tin will be compressed and will go up pipe F into the top tin, which in turn will force the water in this tin up and out of the jet tube D.

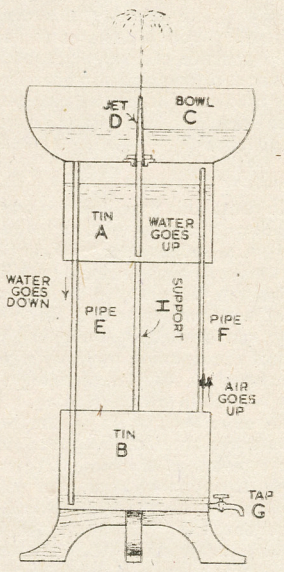
The fountain will continue to play until the top tin is empty. It is restarted by drawing off the water in the bottom tin by means of the tap G. The above process is then repeated, using the water just drawn off to fill the top tin.

Construction

Now start to make the fountain. First we want two tins—the actual size really does not matter so long as they are both alike. It should be quite easy to get two tins having a diameter of about 6ins, 4ins. high, one of which must have a well fitting lid. Sweet tins or large size floor polish tins are excellent.

The bottom tin B, must have its lid well soldered on, and it would also be advisable to solder round the bottom and sides of both tins in order to make them perfectly airtight. This is very important, for if there is a leak anywhere it will prevent the jet of water from rising to its full height.

Next we require a bowl to collect



A sectional view showing the parts

the water thrown up by the jet. If it is not possible to get the usual shaped fountain bowl we can always use another tin; one a little larger in diameter and rather shallow would answer very well. This must be soldered on to the top of the lidless tin. We shall now have two perfectly airtight tins.

Making the Jet

A very good jet can be made from the tapered top of an oil can; one with quite a small hole is best. Make a hole in the centre of the bowl large enough to take the screw from the top of the oil can and solder it securely.

We can now unscrew the jet whenever we want to fill the top tin with water. The removable jet must have a piece of small tube soldered to its underside, long enough to reach nearly to the bottom of tin A when it is screwed into place.

A small tap should now be soldered as near the bottom of the other tin as we can get it. This is to enable us to empty the tin when we want to restart the fountain.

The next job is to fix the tubes which also help to keep the two tins securely spaced with a distance of about 6ins. between them. The size of tube used is not important, but for a small table fountain about $\frac{1}{4}$in. in diameter is plenty large enough.

Tube F is firmly soldered into the top of tin B, passed through a hole in the bottom of tin A (soldered here firmly), and reaching nearly to the top of this tin as shown in the drawing. Tube E goes from the bowl through the top tin A and entering the top of tin B reaches nearly to the bottom, and is neatly soldered to make airtight joins to the two tins.

A short length of tube H is soldered between the two tins in order to hold them securely in place. This only acts as a support and does not require any holes made in the tins.

The Base

A wooden base can be made to hold the tins as shown, but this is not necessary for the good working of the fountain and it may be omitted if desired. It certainly adds to the appearance of the job however.

All the metalwork should be given a coat or two of paint or enamel to help preserve it. Allow a few days to dry properly and we are now ready to test the apparatus.

Should the fountain fail to work or should the jet of water only rise a little way there is most certainly a leakage of air somewhere, and we must again stress the necessity of seeing that all the soldering is perfectly done. A little extra trouble spent in doing this in the first place will be amply repaid later by having a fountain that will work properly.

When refilling the tins with water it is necessary to put a cork in the top of tube E to prevent any water going down into the bottom tin. This stopper is removed when you are ready to start up.

Concluding details on construction and finish of

A TRAILER CARAVAN

LAST week we dealt with the main constructional work for a caravan which the amateur carpenter could build ready for the summer holiday. Now we can proceed to complete the whole thing.

The front and back frames are shown at Fig. 6. These are made of similar wood to the side frames, and with similar joints. The back frame has vertical posts, as shown, to make the door opening. The front frame needs no door opening, so the vertical posts are spaced closer

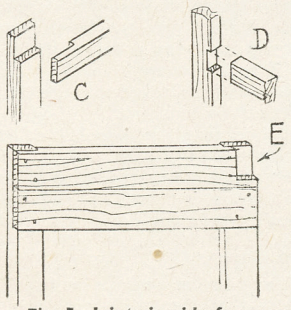


Fig. 5—Joints in side frames

together, as shown dotted, and cross rails added to enclose a space for a small window.

The four frames are now fixed to the floor with nails, and are screwed together at the corners. Fix iron angle brackets between floor and side frames, three each side, to stiffen the structure.

The frames are now covered in, leaving the window and door openings free, of course. For covering, it is suggested to use aluminium sheeting, as being light, strong and weatherproof. Quite possibly this may be obtainable locally. As an alternative, in the absence of three-ply, substitute plywood, or composition board might be employed if it can be guaranteed, after painting, to stand outdoor conditions.

Window Fitment

To finish this part line the window and door openings with strips of $\frac{3}{8}$in. by $1\frac{1}{2}$in. wood, as in detail F, in Fig. 2. This makes a neat finish. These lining strips can be omitted in the small front window. Instead a $\frac{3}{8}$in. by $\frac{3}{4}$in. strip can be nailed round the front half of the opening to leave a rebate for the glass, the latter being afterwards fixed in with a beading.

Three rafters, of $\frac{7}{8}$in. by 2in. wood, should be screwed across the side of the caravan, at convenient distances apart, to support a roof. The aluminium sheet suggested would be excellent for this, or sheet steel would do. It should be bent to the curve of the roof and fixed down with round-headed brass screws. Smear a little paste of white lead and linseed oil under the heads of the screws to seal them against water.

The side window frames can be made up in the usual style and should be hinged at the top to swing up outwards. Fit these with metal stays to keep them in any position.

The Door

A simple door can be put together, framed up in the conventional fashion, with glass panels in the upper half, and for convenience in getting in and out of the caravan a low pair of steps, which can be made either detachable or to swing underneath the caravan when the latter is on the move.

For inside fittings readers can please themselves. Many will not desire anything elaborate, just a small cupboard or two will probably suffice. For sleeping, a pair of folding camp beds will serve, either bought or made.

At this stage the required height of the wheel boxes can be ascertained.

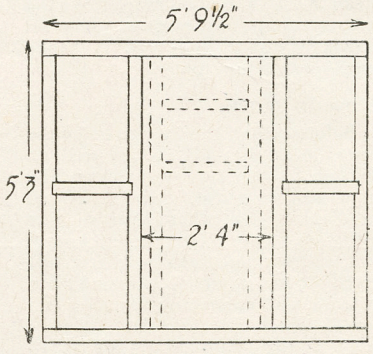


Fig. 6—Frame for back and front

Allow an extra space of 2 to 3 inches. The boxes are just two curved side pieces of wood, fixed to the floor either side of the wheel openings, and covered with sheet metal. A side view of these is shown in Fig. 1. Sufficient ventilation is usually provided by the door and windows, but a metal adjustable ventilator can be bought and fitted if considered advisable.

Finish the caravan with paint or enamel. It is best to apply two coats of flat paint, and then to finish with a coat of clear copal varnish. Number plate and lamp will complete the outfit.

Model Car Drive

COULD you please let me know how I could make some kind of an engine for model six-foot car. (A.C.—Leigh).

AN engine of about $\frac{1}{4}$ h.p. would be needed to drive a model car about 6ft. long. The simplest method would be to use an electric motor of about 12 volts driven by a large car starter battery. A steam engine would need twin cylinders about $1\frac{1}{2}$ stroke and $\frac{7}{8}$ to 1in. bore. The boiler could be of the vertical multi-tubular type, fired by charcoal or anthracite, or if preferred, by a blow-lamp.

With either of the above, the transmission could be by belt or chain, or if a more complex job was not objected to, a propeller shaft could be used, driving the back axle through bevel or worm gearing in regular car fashion.

Dissolving Perspex

KINDLY tell me if coloured Perspex can be melted into liquid form in any way to pour into moulds and again set hard, so that a quantity of small models can be made quicker and easier than cutting with fret machine? (S.M.—Denmark Hill).

WE do not think you would be successful in attempting to dissolve Perspex into liquid form for pouring into moulds. You will find that whilst the material can be dissolved in Acetone, it is unlikely that you would obtain a 'clean' casting due to the presence of air bubbles in the solution. It is also doubtful if the shade of the dissolved material would be constant throughout the mass, and this would either result in a streaky casting, if opaque material has been used, or a blotchy appearance if clear Perspex has been dissolved.

Jet Propelled

CAN you give me details on how to connect the pipes and boiler on a jet propelled toy boat usually known as a Toc Toc boat? (P.W.H.—Huddersfield).

THE usual arrangement of the pipes on a toc-toc type of jet boat, is to take the intake from the lower part of the boat at the stern, to the lowest part of the boiler; the jet or outlet pipe is taken from the upper part of the boiler, downwards to the back of the boat at about the waterline level or just below it. Another plan is to use a single length of pipe and make two or three coils in it to serve as a boiler—arrange the inlet and outlet ends as before.

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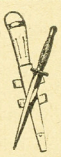

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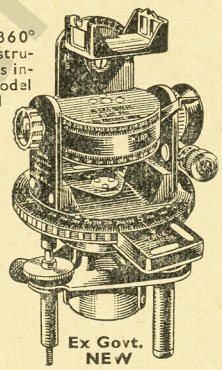

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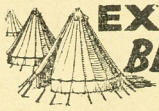

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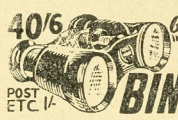

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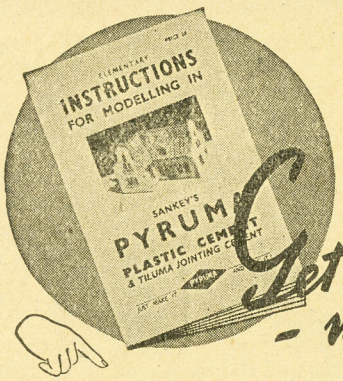

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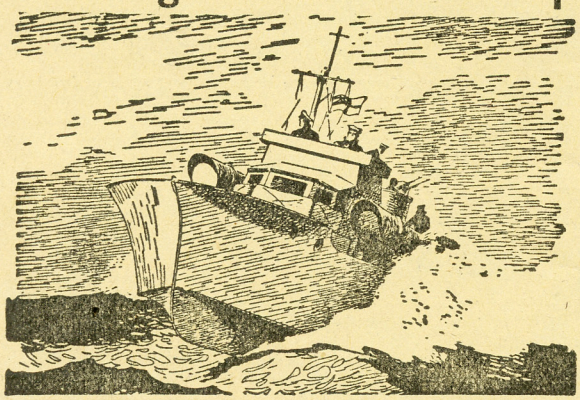

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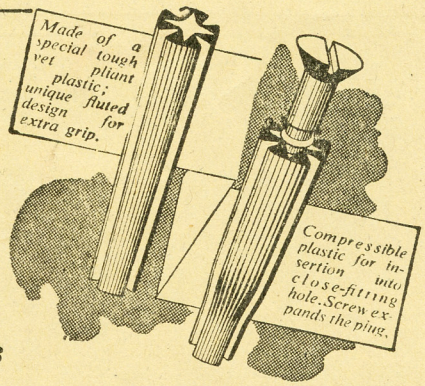

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